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The role of self-disturbances and cognitive biases in the relationship between traumatic life events and psychosis proneness in a non-clinical sample

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ABSTRACT

Background: Traumatic life events have been established as an environmental risk factor for psychosis. However, the exact mechanisms by which traumatic life events increase risk for psychosis are unknown. In the present study we tested an integrative model of traumatic life events being related to psychosis proneness via self-disturbances and cognitive biases.

Methods: The sample consisted of 653 healthy people. Traumatic life events, self-disturbances, cognitive biases and psychosis proneness were assessed with self-report questionnaires. The direct and an indirect model of the relationship between traumatic life events and psychosis proneness were compared using path analyses with structural equation modelling in a cross-sectional study.

Results: There was a significant direct effect of traumatic life events on psychosis proneness. However, path analysis suggested better fit of the indirect model including paths from trauma to psychosis proneness via cognitive biases and self-disturbances. There were significant paths from traumatic life events to cognitive biases and self-disorders. Self-disorders significantly predicted cognitive biases. Finally, cognitive biases and self-disorders significantly predicted psychosis proneness. Exclusion of any paths, apart from direct path in the model, significantly reduced model fitness.

Discussion: The results revealed that a direct relationship between trauma and psychosis proneness became insignificant when taking into account the influence of self-disorders and cognitive biases. This suggests that the interactions between disrupted self-experience, impaired information processing and traumatic life events are of importance in psychosis proneness. This model should be further tested in a longitudinal study on a clinical sample.

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1. Introduction

Traumatic life events (Varese et al., 2012; Velikonja et al., 2015) and cognitive biases (e.g. Gawęda and Prochwicz, 2015) are potential risk factors for both clinical psychosis as well as for psychosis proneness (i.e., increased frequency of psychotic-like experiences) in the general

population. Furthermore, self-disturbances, defined as anomalies in the subjective experience of the self (Parnas and Henriksen, 2014), have been suggested as a core characteristic of schizophrenia spectrum disorders (SSD) (Parnas and Jansson, 2015; Sass, 2014). Interestingly, self-disturbances are reported in ultra-high risk (UHR) samples who seek (Koren et al., 2013; Nelson et al., 2012) and who do not seek help (Koren et al., 2016). Furthermore, self-disturbances have been found to be related to psychotic-like experiences in healthy people without psychosis (Cicero et al., 2016b; Torbet et al., 2015). Hence, self-disturbances may be a very early factor related to psychosis proneness.

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However, to date, these risk factors have been investigated separately, leaving open the question as to how trauma, self-disturbances and cognitive biases might interact in predicting psychotic-like experiences.

Accumulating evidence points to a significant role of traumatic life events in contributing to the risk of psychosis (for meta-analyses see: Bonoldi et al., 2013; Kraan et al., 2015; Varese et al., 2012). Indeed, exposure to traumatic life events is significantly more frequent in SSD than in the general population, as well as traumatic life events are associated with psychosis proneness (for review see: Velikonja et al., 2015). Furthermore, Bechdolf et al. (2010) found that 70% of patients at UHR of developing psychotic disorder had experienced a traumatic life event. However, exposure to traumatic life events itself is not a sufficient factor for the development of psychosis (Gibson et al., 2016). Rather, there may be a dynamic interaction between traumatic life events and various other processes that underlie the development of psychosis (Bentall and Fernyhough, 2008; Gibson et al., 2016; Howes and Murray, 2014).

Recently, some authors have suggested that traumatic life events shape psychosis proneness through cognitive biases (Bentall and Fernyhough, 2008; Gibson et al., 2016; Howes and Murray, 2014), which are dysfunctional patterns of information processing. Several cognitive biases have been hypothesized to play a particular role in the development of psychosis with the most consistent findings suggesting the prominent role of attributional biases (Devylder et al., 2013; So et al., 2015), external misattribution biases (Johns et al., 2010), threat anticipation (Freeman et al., 2013; Reininghaus et al., 2016) or attention to threat (Prochwicz and Klosowska, 2017), and jumping to conclusions (Dudley et al., 2016; McLean et al. in press). As similar to traumatic life events, cognitive biases have been observed across all stages of the psychosis phenotype. Surprisingly, although both traumatic life events and cognitive biases are well-established risk factors for psychosis and previous studies have found that they interact with each other in conferring the risk of psychotic symptoms (Bentall and Fernyhough, 2008; Gibson et al., 2016; Howes and Murray, 2014), cognitive biases have not yet been investigated as a process explaining the relationship between traumatic life events and psychosis.

Furthermore, to date, none of the theoretical models have taken into account a putative 'core' trait-phenotypic abnormality of SSD – self-disorders (Parnas and Jansson, 2015) – in explaining the mechanisms by which environmental factors shape the risk of psychosis. Contemporary phenomenological accounts conceptualize self-disorders in SSD as alterations in basic self-awareness that refer to the most fundamental level of selfhood, i.e. the minimal self ('ipseity') (Hur et al., 2014; Parnas and Handest, 2003), which refers to the implicit, pre-reflective sense of ownership of experience ('myness') and sense of agency. This aspect or level of selfhood is thought to be unstable in SSD, giving rise to anomalous subjective experiences which evolve over time into frank psychotic symptoms (Parnas and Henriksen, 2014). Hyper-reflexivity and diminished self-presence are hypothesized to underlie self-disturbances in SSD (Sass and Parnas, 2003). The first studies in this wave of research (Moller and Husby, 2000; Parnas et al., 1998) empirically confirmed the presence of self-disorders among first admission psychotic patients. Further, larger scale studies (Nordgaard and Parnas, 2014; Parnas et al., 2011) are consistent with these findings. To date, this line of research has found that self-disorders are related to symptoms (Nordgaard and Parnas, 2014) and functional outcome (Comparelli et al., 2016; Nordgaard and Parnas, 2014; Nordgaard et al., 2015) of SSD patients. Self-disorders precede the onset of psychosis (Davidsen, 2009; Koren et al., 2016; Koren et al., 2013; Nelson et al., 2012). Some studies have indicated that the presence of self-disorders distinguished SSD from bipolar disorder (Parnas et al., 2003) and other psychotic disorders (Nelson et al., 2013; Parnas et al., 2003; Thompson et al., 2014).

Recently, it has been shown that self-disorders are present among healthy people who have psychotic-like experiences as assessed through a structured interview (Torbet et al., 2015) or using a recently

developed self-report questionnaire (Cicero et al., 2016b). In their recent study, Parnas et al. (2016) showed that premonitory self-disturbances assessed with the MMPI (Minnesota Multiphasic Personality Inventory) scale predict the lifetime development of schizophrenia spectrum psychosis. In addition, a recent study yielded a positive correlation between traumatic life experience and self-disorders in a first episode psychotic patients, indicating that adversity may play a role in the development of anomalous self-experiences (Haug et al., 2015); however, significant correlations were found only in women. According to the concept of primary (Borda and Sass, 2015) and secondary factors (Sass and Borda, 2015), it is likely that any disturbances in early neurodevelopmental processes may negatively impact primary processes, such as perceptual integration and perceptual organization, leading to self-disturbances (Borda and Sass, 2015). On the other hand, secondary processes such as hyper-reflectivity, which may involve biased information processing strategies (e.g. aberrant salience), may be activated as a reactionary coping strategy that paradoxically increases self-disturbances (Sass and Borda, 2015). Hence, it is possible that exposure to traumatic life events not only changes the way people process or appraise information, but also impact 'core' aspects of self-experience (e.g., implicit sense of 'ownership' or 'first person perspective' on experience).

In the present study we aimed to investigate whether cognitive biases and self-disorders play a significant role in the relationship between traumatic life events and psychosis proneness (i.e. an increased frequency of psychotic-like experiences). According to a preliminary study showing a relationship between traumatic life events and self-disturbances among women (Haug et al., 2015), we hypothesized that exposures to traumatic life events would result in changes to basic self-experiences, expressed by the presence of self-disturbances. Simultaneously, we hypothesized that more frequent traumatic life events would result in more cognitive biases. According to recent theoretical considerations (Nelson et al., 2014a, 2014b), we expected a significant pathway from self-disorders to information processing biases. We hypothesized that self-disorders influence cognitive biases rather than the opposite, as self-disorders have been identified as appearing early in the development (Parnas and Henriksen, 2014). Finally, we hypothesized two pathways leading from traumatic life events to psychosis proneness, one via cognitive biases and another one via self-disorders.

2. Methods

2.1. Participants

Healthy participants were recruited from university students (different faculties including: pedagogy, medicine, nursing, psychology) across four different sites (population ranging from 140 000 to 1 700 000). All participants who had a history of being diagnosed and/or treated for any psychiatric disorders or neurological diseases were excluded from analyses (62 participants excluded). A history of clinical diagnosis was established based on self-report socio-demographic questionnaire prepared for this study. The final sample consisted of 653 participants (463 females and 190 males) with an age range of 18–37 years ($M = 22.24$, $SD = 3.14$).

2.2. Measures

2.2.1. Community Assessment of the Psychic Experiences (CAPE) (Stefanis et al., 2002)

The CAPE measures overall frequency and distress of positive psychotic-like experiences (20 items; e.g. item: 'Do you ever feel as if you are under the control of some force or power other than yourself?'), negative psychotic-like experiences (14 items; e.g. 'Do you ever feel that your feelings are lacking in intensity?') and depressive symptoms (8 items; e.g. 'Do you even cry about nothing?'). In the present study, the Polish version of the CAPE was used (Gawęda et al., 2015). Our

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